

AMENDMENT UNDER 37 C.F.R. § 1.116
Appln. No. 09/885,943

REMARKS

Claim 1 is further amended to include the feature that the gallium nitride phosphide single crystal layer in contact with the crystalline layer of boron phosphide is made of $\text{GaN}_{0.97}\text{P}_{0.03}$. Support for this feature is described, e.g., at page 22, line 34, to page 23, line 9, of the specification as originally filed. No new matter has been added.

Claim 16 is further amended to include all of the limitations of amended Claim 1. No new matter has been added.

In view of amended Claim 16 which now includes all of the limitations of amended claim 1 (device), Applicant respectfully requests Rejoinder of method of making Claims 16, 19 and 20 based on patentability of Claim 1. See MPEP §821.04.

Entry of the Amendment is hereby requested as placing the case in condition for allowance.

Claim Rejections - 35 U.S.C. § 103

Claims 1 and 5 have been rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Hatano et al. (U. S. Patent 5,042,043) in view of Kawai (JP411045892A) and Terashima et al. (U. S. Patent 6,069,021).

Applicant respectfully traverses the rejection of Claims 1 and 5.

As recited in amended Claim 1, the gallium nitride phosphide single crystal layer in contact with the crystalline layer of boron phosphide is made of $\text{GaN}_{0.97}\text{P}_{0.03}$. This feature has the effect that “[t]he crystalline buffer layer 8 comprising BP single crystal and the lower clad layer 3 comprising $\text{GaN}_{0.97}\text{P}_{0.03}$ single crystal layer were matched in the lattice constant.

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Accordingly, on the crystalline buffer layer 8 comprising a BP single crystal layer and constituting the double structure buffer layer 9, a good $\text{GaN}_{0.97}\text{P}_{0.03}$ single crystal layer reduced particularly in the density of crystal defects such as misfit dislocation was produced.” (See, page 23 lines 3-9).

Amended Claim 1 differs from Hatano, Kawai or Terashima in that the gallium nitride phosphide single crystal layer made specifically of $\text{GaN}_{0.97}\text{P}_{0.03}$ is formed in contact with the crystalline layer of boron phosphide. On the other hand, Hatano, Kawai or Terashima neither discloses nor suggests a $\text{GaN}_{0.97}\text{P}_{0.03}$ layer formed in contact with boron phosphide. There is nothing in the cited prior art which would motivate one of ordinary skill to attain the present invention or teach the desireability of such structure.

Claim 5 depends on Claim 1 and is patentable for at least the same reasons as Claim 1.

Therefore, Applicant respectfully requests reconsideration and withdrawal of the rejection of Claims 1 and 5 under 35 U.S.C. § 103(a).

The dependent Claims 4, 10-12 and 14-15 have been rejected under 35 U.S.C. § 103(a).

Claim 4 has been rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Hatano, Kawai and Terashima as applied to Claim 1, in view of Liu (U.S. Patent 5,612,551).

Claims 10-12 have been rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Hatano, Kawai and Terashima, as applied to Claim 1, and further in view of Doll (U.S. Patent 5,326,424).

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Claims 14-15 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Hatano, Kawai and Terashima, as applied to Claim 1, and further in view of Isokawa et al (6,121,637).

Applicant respectfully traverses the rejection of Claims 4, 10-12 and 14-15 based on their dependency from Claim 1, newly amended with traversing arguments given above. The dependent claims are patentable for at least the same reasons as set forth above covering Claim 1. Neither the reference to Liu, to Doll, nor to Isokawa overcomes the deficiencies of Hatano, Kawai and Terashima in light of newly amended Claim 1.

Therefore, Applicant respectfully requests that the Examiner reconsider and withdraw the rejection of Claims 4, 10-12 and 14-15 under 35 U.S.C. § 103.

Allowance of Claims 1, 4, 5, 10-12, 14-16, 19 and 20 is earnestly solicited.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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PATENT TRADEMARK OFFICE

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APPENDIX

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 17, 18 and 21 are canceled.

The claims are amended as follows:

1. (Twice Amended) A group-III nitride semiconductor light-emitting device comprising a single crystal substrate having thereon a light-emitting part structure comprising a gallium nitride phosphide ($GaN_{1-x}P_x$, wherein $0 < X < 1$) single crystal layer provided via a boron phosphide (BP)-based buffer layer, wherein the boron phosphide-based buffer layer comprises a multilayer structure including an amorphous layer and a crystalline layer formed on the amorphous layer, both the amorphous layer and the crystalline layer being made of [the same material] boron phosphide (BP), and the gallium nitride phosphide single crystal layer being made of $GaN_{0.97}P_{0.03}$ is formed in contact with the crystalline layer of boron phosphide.

16. (Amended) A method for producing a group-III nitride semiconductor light-emitting device, comprising

forming a boron phosphide (BP)-based buffer layer on a single crystal substrate, and providing a light-emitting part structure containing a gallium nitride phosphide ($GaN_{1-x}P_x$, wherein $0 < X < 1$) single crystal layer provided via a boron phosphide (BP)-based buffer layer, wherein the boron phosphide-based buffer layer comprises a multilayer structure including an amorphous layer and a crystalline layer formed on the amorphous layer, both the amorphous layer and the crystalline layer being made of boron phosphide (BP), and the gallium

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nitride phosphide single crystal layer being made of $\text{GaN}_{0.97}\text{P}_{0.03}$ is formed in contact with the
crystalline layer of boron phosphide.